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28078 7590 11/09/2007 MAGINOT, MOORE & BECK, LLP CHASE TOWER 111 MONUMENT CIRCLE SUITE 3250 INDIANAPOLIS, IN 46204			EXAMINER CHAPMAN, JEANETTE E	
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FORMWORK
[Katawaku]

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APPLICANT	(71): HAISHIITO KOGYO K.K.
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[Claim(s)]

/2*

[Claim 1] A formwork characterized by affixing a formwork-affixing sheet comprising a highly slidable specific polyolefin resin on the face thereof coming in contact with a placed concrete.

[Detailed Specifications]

[0001]

[Field of Industrial Application] The present invention pertains to a formwork, and in particular, it relates to a concrete formwork having outstanding formwork releasability effected after placed concrete has hardened whereby aesthetics and quality of the applicable placed-up concrete is improved, and a major decrease in costs can be planned.

[0002]

[Prior Art] Formworks have been used in the past for the purpose of supporting the applicable concrete until the applicable concrete hardened and attained the proper strength in the prescribed shape or dimensions.

Such a formwork is composed of a sheathing board contacting the placed concrete directly, timbering, which supports the applicable sheathing board and is a tryout structure fixed in a prescribed position, fastening hardware for fastening these parts, etc. Normally, lumber, lauan plywood, tropical woods, aluminum alloys, plastics, and the like are used for the materials of the aforesaid sheathing board. The aesthetics of the surface of the placed-up concrete can vary depending on the material of the aforesaid sheathing board. When the placed-up surface of the concrete, such as exposed concrete, demanded to be attractive in particular, it is necessary

* Numbers in the margin indicate pagination in the foreign text.

to select the material of the aforesaid sheathing board.

[0003]

[Problems to be Solved by the Invention] However, when lumber was used as the material of the aforesaid sheathing board, the wood grain was reflected on the placed-up concrete surface. And if a metal form was used, a smooth and glossy surface was obtained, but on the other hand, there was a problem because the surface of the applicable concrete turned brown from rust. When lauan plywood was used as the material of the aforesaid sheathing board, there was an additional problem because it became striped with the distinctive longitudinal stripes of the lauan fibers. And if a poor-quality tropical wood was used, there were problems because the concrete surface was colored with various colors, such as yellow, red and brown, and fiber fragments torn off during demounting stuck thereto. An aluminum alloy formwork panel, moreover, had problems because if enough mold release was not applied, an unsightly cuticle developed on the concrete surface removed during demounting. If a plastic was used, an attractive smooth and glossy concrete face was obtained, but on the other hand, there was a problem because inexplicable black stains sometimes remained.

[0004] In addition, formwork installation costs took up 15 to 30% of the skeleton work costs. Thus, depending on rationalizing it, it was a large expenditure where there was some room for reduction, and the economic feasibility of a formwork is an important requirement. The economic feasibility of a formwork depends on the purchasing price and durability (rotation usage) of the formwork; hence, it is desirable to reuse the applicable formwork.

[0005] However, since the concrete demounting performance (peelability) of the material comprising the aforesaid sheathing board is inferior; it is demounted in a state with the concrete stuck to the side of the sheathing board. Thus, to reuse the aforesaid sheathing board, the work for removing the stuck concrete had to be performed after the demounting, and there was a problem because of the cost and labor involved. Therefore, it is an object of the present invention to solve such a problem, and to provide a formwork outstanding in formwork demounting performance effected after the placed concrete hardened, wherein the aesthetics and quality of the applicable placed-up concrete are improve, and a major decrease in costs may be planned.

[0006]

[Means for Solving the Problems] In order to achieve these objects, the present invention provides a formwork characterized by affixing a formwork-affixing sheet comprising a highly slidable specific polyolefin resin on the face thereof coming in contact with a placed concrete.

[0007]

[Effects] According to the present invention, by affixing a formwork-affixing sheet comprising a highly slidable specific polyolefin on the formwork face coming in contact with the placed concrete, the aforesaid formwork can be provided with excellent demounting performance, the aesthetics and quality of the applicable concrete after placing up are improved, and a major decrease in costs can be planned.

[0008] That is, because the aforesaid highly slidable specific polyolefin resin is self-lubricating and is outstanding in slidability,

the aforesaid formwork-affixing sheet can be peeled readily even after the concrete has hardened enough. Consequently, it is not necessary to use a mold release agent. And since the applicable formwork-affixing sheet is superior in durability, it can be used repeated, making it economically advantageous. Since the concrete is not affixed to the sheathing board, work for removing any affixed concrete after the demounting can be eliminated, and the sheathing board can be used repeatedly.

[0009] And since the aforesaid highly slidable specific polyolefin resin is outstanding in moldability and flowability, any given uneven pattern can be formed readily on the surface of the aforesaid formwork-affixing sheet. As a consequence, an attractive, finely-detailed uneven pattern can be formed readily on the applicable concrete surface and the aesthetics of the applicable concrete may be improved. Moreover, the aforesaid uneven pattern can be formed simultaneous to placing of the concrete; hence, a major cost reduction is possible.

[0010] In addition, tropical woods used currently for plywood panels are difficult to procure according to deforestation records; hence, the use of northern conifers is in demand. However, it is difficult to manufacture plywood from these conifers since they have knotholes. As a consequence, a plywood surface treatment, including a knothole treatment on the surface of this plywood, is required. By affixing the formwork-affixing sheet pertaining to the present invention instead of conducting this surface treatment, accordingly the aforesaid problems can be solved easily.

[0011] Furthermore, the highly slidable specific polyolefin

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resin has outstanding wear resistance; hence, it is not eroded by the aggregate, sand, and the like contained in the concrete. Moreover, the applicable highly slidable specific polyolefin resin has outstanding chemical resistance; hence, it also is stable against concrete exhibiting alkalinity. Further yet, the aforesaid highly slidable specific polyolefin resin is inexpensive; hence, a decrease in costs can be planned.

[0012]

[Practical Examples] The practical examples pertaining to the present invention are described next with reference to the drawings. Figure 1 is a conceptual drawing showing a state in which the formwork-affixing sheet pertaining to the practical examples of the present invention is affixed to a sheathing board; Figure 2 is a block diagram showing a state in which the formwork-affixing sheet is affixed to a sheathing board; and Figure 3 is a partial enlarged cross section showing a state in which the concrete is placed in a formwork manufactured using the sheathing board shown in Figure 2.

[0013] The formwork-affixing sheet shown by the reference symbol "1" in Figure 1 is composed of the highly slidable specific polyolefin resin, "Rubmer" (trade name: made by Mitsui Petrochemical Industries, Co. Ltd.), which is extremely outstanding in self-lubrication property, slidability, durability, wear resistance, moldability and chemical resistance, was used in this practical example as such a highly slidable specific polyolefin resin. The aforesaid formwork-affixing sheet 1 is affixed to one side of the sheathing board 2, that is, the side on which the formwork is to be assembled with an adhesive using the applicable

sheathing board 2 and serving as the face coming in contact with the applicable placed concrete while placing concrete therein. The formwork-affixing sheet 1 and sheathing board 2 were fastened by means of a hot press and using polyvinyl carbazole (PVC) as the adhesive in this practical example to pressurize it for 5 minutes at 140°C. Since the aforesaid formwork-affixing sheet 1 is outstanding in moldability, any given uneven pattern can be formed on the surface thereof, as needed, or the surface can be smoothed. Therefore, the placed-up concrete surface can be endowed with the desired aesthetics. The formwork-affixing sheet 1 is affixed to the prescribed face of the sheathing board 2, as shown in Figure 2, by using the above process.

[0014] The formwork is assembled by using the sheathing board 2 affixed with the formwork-affixing sheet 1, timbering, and the like, with the applicable formwork-affixing sheet 1 on the inside. The formwork 5, as shown in Figure 3, was obtained by using the above process. Next, as shown in Figure 3, concrete 3 is placed in this formwork 5 and allowed to age for the desired period of time. Then the aforesaid placed concrete 3 is allowed to compact by its own weight, compacted a vibrator, etc. Furthermore, the aforesaid self-weight acts as a lateral pressure on the formwork 5. When this lateral pressure does act thereon, friction is generated between the aforesaid formwork-affixing sheet 1 and the aggregate 4, sand 6, and the like in the concrete 3. But since the applicable formwork-affixing sheet 1 is outstanding in wear resistance, it is not eroded by the aforesaid friction. Moreover, since the aforesaid formwork-affixing sheet 1 is outstanding in chemical resistance, it is

stable against concrete 3 exhibiting alkalinity. Consequently, the surface of the formwork-affixing sheet 1 always can be maintained in a consistent state, and the surface of the placed-up concrete 3 always can be endowed with the desired aesthetics.

[0015] After the aforesaid desired period of aging, the formwork 5 is dismantled from the hardened concrete 3. Here, the formwork-affixing sheet 1 contacting the concrete 3 is extremely outstanding in self-lubrication and slidability; hence, after the concrete 3 has hardened, it can be demounted easily without affecting the surface of the concrete 3. Furthermore, since the formwork-affixing sheet 1 also is outstanding in durability, it can be used repeatedly, which is economically advantageous. And as the concrete 3 is not stuck to the sheathing board 2, the work for removing the stuck concrete after demolding can be eliminated. In addition, the sheathing board 2 also can be used repeatedly, and a major decrease in costs can be planned accordingly.

[0016] Moreover, although Rubmer was used as the highly slidable specific polyolefin resin in this practical example, the present invention is not limited thereto. Naturally another highly slidable specific polyolefin resin can be used. Moreover, a PVC hot press was used to affix the formwork-affixing sheet 1 to the sheathing board 2 in this practical example, but the present invention is not limited thereto. Affixing thereof can be performed using this adhesive, double-sided tape, and the like, or other adhesive. Moreover, the sheet and board can be fixed using a mechanical means, such as a stapler or nails.

[0017]

[Advantages of the Invention] As described above, according to the formwork pertaining to the present invention, by affixing the formwork-affixing sheet comprising the highly slidable specific polyolefin resin to the face of the formwork coming in contact with the placed concrete, the aforesaid formwork-affixing sheet can be peeled easily from the applicable concrete even after the aforesaid concrete hardened adequately.

Since the aforesaid formwork-affixing sheet also is outstanding in durability, it can be used repeated. In addition, since the concrete does not become stuck to the sheathing board, the work for removing the stuck concrete after the demounting can be eliminated and the sheathing board also can be used repeatedly. As a result, a major decrease in costs can be planned. Furthermore, since the aforesaid formwork-affixing sheet has superior moldability and flowability, any given uneven pattern can be formed easily on the surface of the applicable formwork-affixing sheet.

Consequently, the aesthetics of the applicable concrete can be improved at the same time the aforesaid concrete is placed, which is economically advantageous. And moreover, because the aforesaid formwork-affixing sheet has excellent wear resistance, it is not eroded by the aggregate, sand, and the like contained in the concrete, and further, since it has superior chemical resistance, it is also stable against concrete exhibiting alkalinity. Therefore, the surface of the formwork-affixing sheet always can be maintained in a consistent state, while the surface of the placed-up concrete always can be endowed with the desired aesthetics.

[0018] As a result, a major decrease in costs can be achieved, while the quality of the hardened concrete can be improved.

[Brief Description of the Drawings]

[Figure 1] A concept drawing showing a state in which the /4
formwork-affixing sheet pertaining to the practical examples of the present
invention is affixed to a sheathing board.

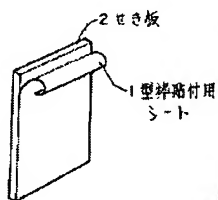
[Figure 2] A block diagram showing a state in which the formwork-affixing
sheet is affixed to the sheathing board.

[Figure 3] A partial enlarged cross section showing a state in which
concrete is placed in a formwork manufactured using the sheathing board
shown in Figure 2.

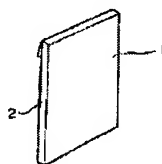
[Explanation of the Codes]

- 1: formwork-affixing sheet
- 2: sheathing board
- 3: concrete
- 4: aggregate
- 5: formwork
- 6: sand

[Figure 1]



[Figure 2]



[Figure 3]

